

EXHIBIT A

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571-272-7822

Paper No. 8
Entered: July 28, 2017

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NOKIA SOLUTIONS AND NETWORKS US LLC, and
NOKIA SOLUTIONS AND NETWORKS OY,
Petitioner,

v.

HUAWEI TECHNOLOGIES CO. LTD.,
Patent Owner.

Case IPR2017-00661
Patent 9,060,268 B2

Before JENNIFER MEYER CHAGNON,
MICHELLE N. WORMMEESTER, and CHRISTA P. ZADO,
Administrative Patent Judges.

CHAGNON, *Administrative Patent Judge.*

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

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I. INTRODUCTION

Nokia Solutions and Networks US LLC, and Nokia Solutions and Networks Oy (collectively, “Petitioner”)¹ filed a Petition for *inter partes* review of claims 1–3 (“the challenged claims”) of U.S. Patent No. 9,060,268 B2 (Ex. 1001, “the ’268 patent”). Paper 2 (“Pet.”). Petitioner relies on the Declarations of David Lyon, Ph.D. (Ex. 1003) and Balazs Bertenyi (Ex. 1004) to support its positions. Huawei Technologies Co. Ltd. (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”).

We have authority to determine whether to institute *inter partes* review. *See* 35 U.S.C. § 314(b); 37 C.F.R. § 42.4(a). Upon consideration of the Petition and the Preliminary Response, and for the reasons explained below, we determine that the information presented shows a reasonable likelihood that Petitioner would prevail with respect to all of the challenged claims. *See* 35 U.S.C. § 314(a). Accordingly, we institute trial as to claims 1–3 of the ’268 patent.

A. Related Proceedings

The parties indicate that the ’268 patent is the subject of the following ongoing district court proceeding: *Huawei Techs. Co. v. T-Mobile US, Inc.*, Case No. 2:16-cv-00057 (E.D. Tex.). Pet. 1; Paper 6, 2.

B. The ’268 Patent

The ’268 patent is titled “Negotiating Security Capabilities During Movement of UE,” and was filed as U.S. application No. 12/717,385 on March 4, 2010. Ex. 1001, at [21], [22], [54]. The ’268 patent claims

¹ Petitioner identifies T-Mobile USA, Inc. and T-Mobile US, Inc. as additional real parties-in-interest. Pet. 1.

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priority to application PCT/CN2008/072486, filed on September 24, 2008.

Id. at [63]. The '268 patent also claims priority to Chinese application No. CN 2007 1 0181068, filed September 29, 2007. *Id.* at [30].

The '268 patent "relates to communication technologies, and in particular, to a method, system, and apparatus for negotiating security capabilities during movement of a User Equipment (UE)." *Id.* at 1:16–19. Specifically, the '268 patent describes a method and system "for negotiating security capabilities during movement of a UE, so that the security capabilities can be negotiated when the UE in the idle state moves from an LTE network to a 2G/3G network." *Id.* at 1:66–2:8.

Figure 1 of the '268 patent is reproduced below.

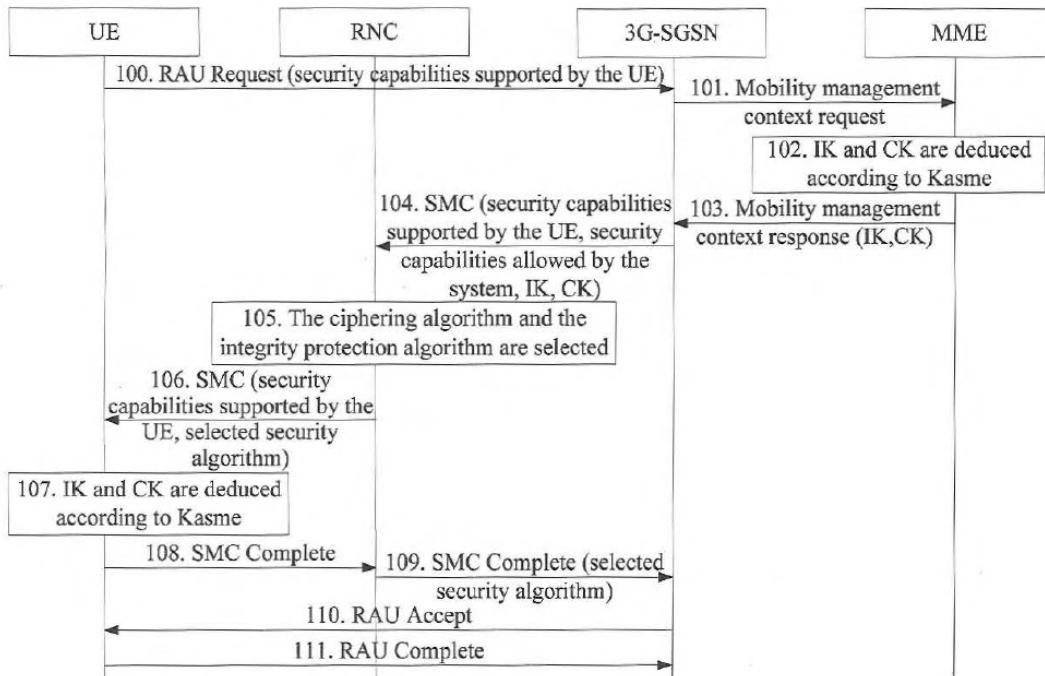


FIG. 1

Figure 1, reproduced above, is a flow chart of a method for negotiating a security capability during movement of a UE, according to an embodiment of the '268 patent. *Id.* at 3:17–19. According to the method illustrated in

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Figure 1, a UE sends a Routing Area Update (RAU) request to the 3G Serving GPRS Support Node (SGSN), at step 100. *Id.* at 4:16–17. The RAU request includes, among other things, the “security capabilities supported by the UE, for example, a ciphering algorithm and/or an integrity protection algorithm.” *Id.* at 4:18–23. At steps 101–103, “[t]he 3G SGSN obtains the AV-related keys from the MME through a mobility management context message, where the AV-related keys are deduced according to the root key.” *Id.* at 4:24–27.

At step 104, the “SGSN sends a Security Mode Command (SMC) message to the RNC. The message carries the security capabilities supported by the UE, security capabilities allowed by the system, and a security key.” *Id.* at 4:51–54. At step 105, “the RNC selects security algorithms, including a ciphering algorithm and an integrity protection algorithm,” and at step 106, the RNC “sends an SMC message that carries the security capabilities supported by the UE and the selected security algorithm to the UE.” *Id.* at 4:57–61.

At step 107, the “UE deduces the AV-related keys according to its own root key, where the AV-related keys include IK and CK, or an IK' and a CK' further derived from the IK and the CK through unidirectional transformation.” *Id.* at 4:64–67. At steps 108 and 109, “the UE . . . sends an SMC Complete message to the RNC [and t]he RNC sends an SMC Complete message that carries the selected security algorithm to the 3G SGSN.” *Id.* at 5:4–7. Finally, at step 110, the “3G SGSN sends a RAU Accept message to the UE” and at step 111, the “UE returns an RAU Complete message to the 3G SGSN.” *Id.* at 5:10–12.

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C. Challenged Claims

Each of the challenged claims is independent. Claims 1–3 of the '268 patent are reproduced below. For convenience of the discussion, the claims are annotated with Petitioner's labeling of the claim elements.

1. [1 *Pre*] In a mobility management entity (MME) of a long term evolution (LTE) network, a method for negotiating security keys comprising:

[1A] receiving a context request for requesting a mobility management context sent by a serving GPRS support node (SGSN) in a second or third generation (2G/3G) network, according to a routing area update (RAU) request from a user equipment (UE) in an idle mode; and

[1B] sending the mobility management context to the SGSN, wherein the mobility management context comprises information for determining security capacities supported by the UE and authentication vector (AV)-related keys that are deduced according to a root key of the MME, [1C] wherein the AV-related keys comprise an Integrity Protection Key (IK) and a Ciphering Key (CK), or comprise values derived from the IK and the CK through an unidirectional transformation.

Ex. 1001, 11:12–28.

2. [2 *Pre*] A mobility management entity (MME) of a long term evolution (LTE) network for negotiating security keys, comprising:

[2A] a receiver configured to receive a context request for requesting a mobility management context sent by a serving GPRS support node (SGSN) in a second or third generation (2G/3G) network according to a routing area update (RAU) request from a user equipment (UE) in an idle mode;

[2B] a processor configured to deduce authentication vector (AV)-related keys according to a root key of the MME, wherein the AV-related keys comprise an Integrity Protection Key (IK) and a Ciphering Key (CK), or comprise values derived from the IK and the CK through an unidirectional transformation; and

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[2C] a transmitter configured to send the mobility management context to the SGSN, wherein the mobility management context comprises information for determining security capacities supported by the UE and the AV-related keys.

Id. at 11:29–12:13.

3. [3 *Pre*] A system for negotiating security keys, comprising:

[3A] a serving GPRS support node (SGSN) in a second or third generation (2G/3G) network, configured to receive a routing area update (RAU) request from a user equipment (UE) when the UE is in an idle mode and moves from a long term evolution (LTE) network to the 2G/3G network, and to send a context request to a mobility management entity (MME) in the LTE network to request a mobility management context according to the RAU request; and

[3B] the MME configured to receive the context request, and send the mobility management context to the SGSN, wherein the mobility management context comprises information for determining security capacities supported by the UE and authentication vector (AV)-related keys that are deduced according to a root key of the MME, [3C] wherein the AV-related keys comprise an Integrity Protection Key (IK) and a Ciphering Key (CK);

[3D] wherein the SGSN is further configured to send the AV-related keys to a radio network controller (RNC).

Id. at 12:14–33.

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D. The Applied References

Petitioner relies on the following references in the asserted grounds.

Pet. 2.

3GPP, *Technical Specification Group Services and System Aspects; GPRS enhancements for E-UTRAN access (Release 8) (3GPP TS 23.401 V1.1.0)*, (July 2007) (Ex. 1005, “TS 23.401”);

3GPP, *Technical Specification Group Services and System Aspects; Rationale and track of security decisions in Long Term Evolved (LTE) RAN / 3GPP System Architecture Evolution (SAE) (Release 8) (3GPP TR 33.821 V0.4.0)*, (July 2007) (Ex. 1006, “TR 33.821”);

3GPP, *Technical Specification Group Services and System Aspects; General Packet Radio Service (GPRS); Service description; Stage 2 (Release 7) (3GPP TS 23.060 V7.4.0)*, (Mar. 2007) (Ex. 1007, “TS 23.060”);

U.S. Patent No. 8,462,742 B2, issued June 11, 2013, to Song et al. (Ex. 1008, “Song”).

E. The Asserted Grounds

Petitioner challenges claims 1–3 as having been obvious under 35 U.S.C. § 103(a) in view of the following three combinations of references: TS 23.401 and TR 33.821; TS 23.060 and TR 33.821; and Song and TR 33.821. Pet. 2, 26–72.

II. ANALYSIS

A. Claim Construction

In an *inter partes* review, claim terms in an unexpired patent are given their broadest reasonable construction in light of the specification of the

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patent in which they appear. *See* 37 C.F.R. § 42.100(b); *Cuozzo Speed Techs. LLC v. Lee*, 136 S. Ct. 2131, 2144–46 (2016) (upholding the use of the broadest reasonable interpretation standard). Under the broadest reasonable construction standard, claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). The claims, however, “should always be read in light of the specification and teachings in the underlying patent,” and “[e]ven under the broadest reasonable interpretation, the Board’s construction ‘cannot be divorced from the specification and the record evidence.’” *Microsoft Corp. v. Proxyconn, Inc.*, 789 F.3d 1292, 1298 (Fed. Cir. 2015) (citations omitted). Further, any special definition for a claim term must be set forth in the specification with reasonable clarity, deliberateness, and precision. *See In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a definition, however, limitations are not to be read from the specification into the claims. *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

The parties propose constructions for several claim terms. *See* Pet. 19–23; Prelim. Resp. 5–9. For purposes of this Decision, we address Petitioner’s arguments regarding certain limitations of claim 2—namely, the recited “receiver,” “processor,” and “transmitter,” each being “configured to” perform certain functions. Pet. 22–23. In the co-pending district court proceeding, Petitioner has argued that these limitations are means-plus-function limitations that lack sufficient corresponding structure. *See* Pet. 22–23; Ex. 1019, 54–59 (the parties’ Joint Claim Construction and Prehearing Statement in the co-pending district court proceeding). For

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purposes of this *inter partes* review Petition, Petitioner asserts that “the broadest reasonable interpretation of each of these limitations [is] software or hardware capable of performing the claimed function.” Pet. 23.

Patent Owner does not address the construction of these limitations of claim 2. At this stage of the proceeding, we have not reached a final decision with regard to whether such limitations are means-plus-function limitations under 35 U.S.C. § 112, ¶ 6, which requires identification of sufficient structure, material, or acts in the specification. *See In re Donaldson Co.*, 16 F.3d 1189, 1193 (Fed. Cir. 1994) (en banc). We, however, are able to analyze Petitioner’s asserted prior art grounds without making such a determination at this stage of the proceeding. For purposes of this Decision on Institution, we construe these terms to mean software or hardware for performing the functions recited in the claim.

We direct the parties, in their subsequent briefing in this proceeding, to address specifically whether or not the “receiver,” “processor,” and “transmitter” limitations of claim 2 invoke 35 U.S.C. § 112, ¶ 6. If so, the parties are directed to identify the corresponding structure from the Specification. If not, the parties are directed to explain their reasoning and address the construction of the terms under the broadest reasonable interpretation.

Upon review of the parties’ contentions and supporting evidence, we determine no issue in this Decision requires express construction of any other claim terms. *See, e.g., Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed ‘to the extent necessary to resolve the controversy.’”) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)). Accordingly,

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for purposes of this Decision, we do not provide any express claim construction beyond that discussed above.

B. Principles of Law

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art²; (3) the level of ordinary skill in the art; and (4) objective evidence of nonobviousness.³ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

In that regard, an obviousness analysis “need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 550 U.S. at 418; *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). A prima facie case of obviousness is established when the prior art, itself, would appear to have suggested the claimed subject matter to a person of ordinary skill in the art. *See In re Rinehart*, 531 F.2d 1048, 1051 (CCPA 1976).

² Patent Owner argues that Petitioner does not appropriately address this *Graham* factor. Prelim. Resp. 23–32. At this stage of the proceeding, we determine that Petitioner has sufficiently addressed the *Graham* factors, and do not find Patent Owner’s argument persuasive.

³ At this stage of the proceeding, the parties have not directed our attention to any objective evidence of non-obviousness.

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We analyze the asserted grounds of unpatentability in accordance with these principles.

C. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art “would have had a Bachelor’s degree in electrical engineering, computer science, or computer engineering with at least 2–3 years of experience in the telecommunications industry, including experience with operating and/or implementing [Third Generation Partnership Project (3GPP)] networks. Additional education might substitute for some of the experience, and substantial experience might substitute for some of the educational background.” Pet. 27 (citing Ex. 1003 ¶ 20). Patent Owner does not address the level of ordinary skill in the art in its Preliminary Response. For purposes of this Decision, we adopt Petitioner’s proposal regarding the level of ordinary skill in the art. The level of ordinary skill in the art further is reflected by the prior art of record. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

D. Whether TR 33.821 Qualifies as Prior Art

Patent Owner argues in its Preliminary Response that Petitioner has failed to show that TR 33.821 qualifies as a printed publication. *See* Prelim. Resp. 9–23. Because each of Petitioner’s asserted grounds relies, in part, on TR 33.821 (*see* Pet. 2), we first address this issue. For the reasons discussed

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below, we determine that Petitioner has made at least a threshold showing that this asserted reference qualifies as a printed publication.⁴

To establish that TR 33.821 qualifies as a printed publication, Petitioner relies on the testimony of Mr. Bertenyi (Ex. 1004). *See* Pet. 23–25. Mr. Bertenyi details his experience with the 3GPP, including his work as chairman for 3GPP’s SA-2 Working Group, as well as for the overall TSG-SA plenary group. Ex. 1004 ¶¶ 3, 9–12. Mr. Bertenyi also testifies that “[b]ased on [his] experience [with 3GPP], [he] can speak with authority as to how the 3GPP standards are developed across the working groups and how 3GPP documents are drafted, distributed, stored and made available to the public without restriction.” *Id.* ¶ 3.

Mr. Bertenyi testifies that there are “over a hundred telecommunications industry participants” in 3GPP. *Id.* ¶ 2. According to Mr. Bertenyi:

In the ordinary course of 3GPP’s regularly-conducted business activities and pursuant to its standard business practices, 3GPP published all proposals, technical reports, technical specifications and other documents related to the development of cellular telecommunications standards to the 3GPP’s publicly-available, unrestricted, online ftp server: <http://www.3gpp.org/ftp/>. Draft proposals, technical reports, technical specifications, change requests, and other documents (“Tdocs”) were assigned a document number (“Tdoc number”) and uploaded to 3GPP’s public ftp server before, during, and after meetings. Making the documents publicly available encouraged discussion and promoted establishment of industry standards for cellular telecommunications.

⁴ Although Patent Owner has not challenged whether TS 23.401 and TS 23.060 qualify as printed publications, we note that we also are persuaded that Petitioner has made at least a threshold showing with respect to these asserted references. *See* Pet. 23–25; Ex. 1004 ¶¶ 29, 31.

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Id. ¶ 20. Documents uploaded to the ftp server received a date and time stamp, indicating when the upload occurred. *Id.* ¶ 21. Mr. Bertenyi also provides a detailed explanation regarding the naming conventions used by 3GPP with respect to proposals, technical reports, technical specifications, and other related documents (e.g., Tdocs). *Id.* ¶¶ 13–19 (citing Ex. 1050 (3GPP TR 21.900 v6.0.0) (describing the procedures for naming and changing 3GPP documents)). Mr. Bertenyi testifies specifically that “the format for the filename of a TR document on the 3GPP server at least includes aabb_xy, which provides *information regarding the contents . . . of the document.*” *Id.* ¶ 15 (citing Ex. 1050, 21) (emphasis added); *see also id.* ¶ 16 (providing the same testimony with respect to TS documents on the 3GPP server). Mr. Bertenyi then identified TR 33.821 as a document that was published and made available on the ftp server. *Id.* ¶ 30.

Patent Owner argues that “regardless of whether *some* 3GPP documents were publicly available, neither Petitioner nor Mr. Bertenyi show that the *specific TR 33.821 document* was publicly accessible prior to September 29, 2007.” Prelim. Resp. 10.

We look to the underlying facts to make a legal determination as to whether a reference is a printed publication. *Suffolk Techs., LLC v. AOL Inc.*, 752 F.3d 1358, 1364 (Fed. Cir. 2014). The determination of whether a given reference qualifies as a prior art “printed publication” involves a case-by-case inquiry into the facts and circumstances surrounding its disclosure to members of the public. *In re Klopfenstein*, 380 F.3d 1345, 1350 (Fed. Cir. 2004). The key inquiry is whether the reference was made “sufficiently accessible to the public interested in the art” before the critical date. *In re*

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Cronyn, 890 F.2d 1158, 1160 (Fed. Cir. 1989); *In re Wyer*, 655 F.2d 221, 226 (CCPA 1981).

According to the Federal Circuit, “[b]ecause there are many ways in which a reference may be disseminated to the interested public, ‘public accessibility’ has been called the touchstone in determining whether a reference constitutes a ‘printed publication’” under 35 U.S.C. § 102.

Kyocera Wireless Corp. v. Int'l Trade Comm'n, 545 F.3d 1340, 1350 (Fed. Cir. 2008) (quoting *In re Hall*, 781 F.2d 897, 898–99 (Fed. Cir. 1986)).

A reference is publicly accessible “upon a satisfactory showing that such document has been disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, can locate it.” *SRI Int'l, Inc. v. Internet Security Sys., Inc.*, 511 F.3d 1186, 1194 (Fed. Cir. 2008).

At this stage of the proceeding, we credit Mr. Bertenyi’s testimony and are persuaded that this is sufficient to show that “persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, [could have] locate[d]” TR 33.821. See *Bruckelmyer v. Ground Heaters, Inc.*, 445 F.3d 1374, 1378 (Fed. Cir. 2006).

E. Asserted Obviousness in View of TS 23.401 and TR 33.821

Petitioner asserts that claims 1–3 are unpatentable under 35 U.S.C. § 103(a) as obvious in view of TS 23.401 and TR 33.821. Pet. 27–43. In addition to the arguments that TR 33.821 does not qualify as prior art, and that Petitioner does not appropriately address the *Graham* factors (both discussed above), Patent Owner argues that the cited combination does not disclose all elements of the challenged claims (Prelim. Resp. 32–47), and

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that Petitioner has not provided sufficient reasons to combine the references (*id.* at 65–66).

We have reviewed the parties’ contentions and supporting evidence. Given the evidence on this record, and for the reasons explained below, we determine that the information presented shows a reasonable likelihood that Petitioner would prevail on this asserted ground.

1. Summary of TS 23.401 (Ex. 1005)

TS 23.401 is a Technical Specification produced by a working group of 3GPP. Ex. 1005, Forward. TS 23.401 addresses enhancements to the existing General Packet Radio Service (GPRS) network to support access to the E-UTRAN⁵ network, and “covers both roaming and non-roaming scenarios and . . . all aspects, including mobility between E-UTRAN and pre-E-UTRAN 3GPP radio access technologies, policy control and charging, and authentication.” *Id.* § 1; Pet. 27.

⁵ E-UTRAN stands for Evolved Universal Terrestrial Radio Access Network and is another term used to describe 4G or LTE networks. *See* Pet. 27 (citing Ex. 1003 ¶ 116).

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Sections 5.3.3.2.2 and 5.3.3.3.2 of TS 23.401 address the RAU update procedure for an idle state UE transitioning from an E-UTRAN network to a pre-E-UTRAN network (e.g., 2G or 3G). Figure 5.3.3.2-2 is reproduced below.

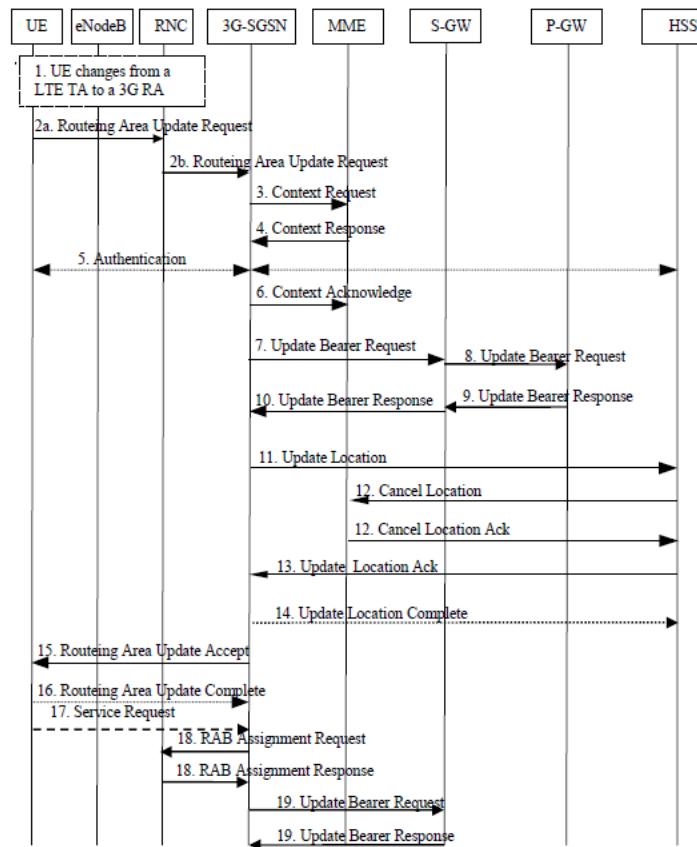


Figure 5.3.3.2-2: E-UTRAN to UMTS RA Update

Figure 5.3.3.2-2, reproduced above, shows an LTE-to-3G RAU update procedure. Ex. 1005 § 5.3.3.2.2. Figure 5.3.3.3-2 illustrates a similar procedure for an LTE-to-2G transition. *Id.* § 5.3.3.3.2. As seen in Figure 5.3.3.2-2, a UE sends an RAU Request to the 3G-SGSN (via the RNC) at steps 2a/2b. *Id.* § 5.3.3.2.2. The 3G-SGSN sends a Context Request to the MME (step 3), and receives a Context Response back from

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the MME (step 4). *Id.* Authentication and security functions may be executed at step 5. *Id.*

2. Summary of TR 33.821 (Ex. 1006)

TR 33.821 is a Technical Report produced by a working group of 3GPP. Ex. 1006, Forward. TR 33.821 “addresses security aspects of the new LTE/SAE network, including how security is handled during mobility events to/from the new LTE network and legacy 2G/3G networks.” Pet. 28 (citing Ex. 1003 ¶ 116); *see* Ex. 1006 § 1.

Figure 13 of TR 33.821 is reproduced below.

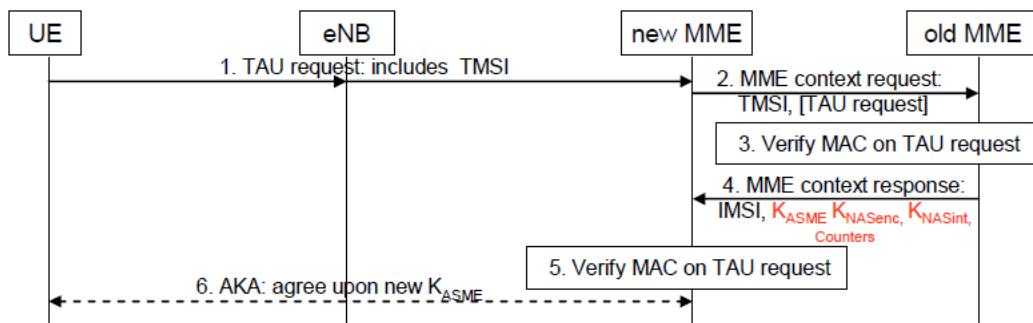


Figure 13: Key handling on idle mode mobility

Figure 13, reproduced above, illustrates a procedure for key handling during idle mode mobility. *Id.* § 7.4.11.3. In relevant part, Figure 13 and the corresponding discussion describe that the MME Context Response includes specific authentication keys and the UE’s security capabilities. *Id.*

3. Analysis

We first address Petitioner’s reasons to combine the references and then turn to particular disclosures of the references upon which Petitioner relies to teach each element of the independent claims. We use the element numbering provided by Petitioner (*see supra* Section I.C.). Where Patent

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Owner has presented arguments in its Preliminary Response, we also address them below.

a. Reasons to Combine

Petitioner asserts that a person of ordinary skill in the art would have combined the teachings of TS 23.401 and TR 33.821 because “they are both concerned with cellular technology and more particularly they both address mobility issues between radio access networks and the implications of the addition of the 4G/LTE network to existing infrastructure.” Pet. 27 (citing Ex. 1003 ¶ 116). Petitioner further explains that the “documents provide views of the same subject matter from the different perspectives of the working groups which authored the documents” and that a person of ordinary skill in the art “would know that in order [to] implement the security negotiation in 4G/LTE networks in the architecture proposed in TS 23.401, they would need to look at both the architecture and security documentation.” *Id.* at 28 (citing Ex. 1003 ¶ 116); *see also* Ex. 1003 ¶ 115 (“A person of ordinary skill in the art would have been familiar with the working groups and would have known that many 3GPP documents must necessarily be read together in order to implement the design features contained therein.”). Finally, Petitioner asserts that TR 33.821 explicitly directs the reader to TS 23.401 when considering idle mode mobility. Pet. 28–29 (citing Ex. 1006 § 7.4.11.3); *see also* Ex. 1003 ¶ 117 (“[T]he documents themselves direct those of ordinary skill to evaluate both documents in conjunction with one another.”). Thus, according to Petitioner, “a person of ordinary skill in the art would have been motivated to combine the teachings of TS 23.401 and TR 33.821 to fully describe a known solution to a known problem.” Pet. 29; Ex. 1003 ¶ 119.

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Patent Owner argues that “a ‘Petitioner’s observation that both references . . . are from the same field of endeavor falls short of an adequate rationale.’” Prelim. Resp. 65 (citing *Spectrum Brands, Inc. v. ASSA ABLOY AB*, Case IPR2015-01563, slip op. at 19 (PTAB Jan. 15 2016) (Paper 7)).

While we agree with Patent Owner that such an assertion alone may be insufficient rationale, as noted above, Petitioner provides more than a simple assertion that the references are from the same field, and provides additional reasons a person of ordinary skill in the art would have combined the references.

Patent Owner further argues that a person of ordinary skill in the art “seeking to support key handing during idle mode mobility between an LTE and a 2G/3G network, for example, would have found no solution in TR 33.821.” *Id.* at 66. Based on the record now before us, however we credit Dr. Lyon’s testimony in this regard and are persuaded that “a person of ordinary skill in the art would have been motivated to combine the teachings of TS 23.401 and TR 33.821 to fully describe a known solution to a known problem.” Ex. 1003 ¶ 119; *see also Estee Lauder Inc. v. L’Oreal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997) (“[A]rguments of counsel cannot take the place of evidence lacking in the record.”) (internal citations and quotation marks omitted).

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Based on the record now before us, we are persuaded that Petitioner has articulated sufficient reasoning⁶ why it would have been obvious to combine these references in the proposed manner.

b. Claim 1

Claim Element 1 Pre – Preamble

Claim 1 recites a “method for negotiating security keys” “[i]n a mobility management entity (MME) of a long term evolution (LTE) network.” According to Petitioner, each of TS 23.401 and TR 33.821 teaches a method of negotiating security keys in an MME of an LTE network. *See* Pet. 29–30 (citing Ex. 1003 ¶ 120; Ex. 1005 §§ 5.3.3.2.2, 5.3.3.3.2; Ex. 1006 §§ 7.4.10, 7.4.11).

Patent Owner, at this stage of the proceeding, has not presented specific arguments regarding this claim limitation. On the record now before us, we are persuaded that Petitioner has shown a reasonable likelihood of demonstrating that the asserted combination teaches or suggests this limitation of claim 1.

Claim Element 1A – Receiving a Context Request

Claim 1 recites “receiving a context request for requesting a mobility management context sent by a serving GPRS support node (SGSN) in a

⁶ Petitioner also argues that “the inter-dependent nature of these documents was recognized by applicant, who disclosed the documents . . . during prosecution, and the examiner who cited to both TS 23.401 and TR 33.821 during prosecution.” Pet. 29. We agree with Patent Owner that “the fact that the applicant cited the TS 23.401 and TR 33.821 references to the examiner is in no way an admission or recognition that these references are ‘inter-dependent’” (Prelim. Resp. 66), and we do not find this portion of Petitioner’s argument persuasive.

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second or third generation (2G/3G) network, according to a routing area update (RAU) request from a user equipment (UE) in an idle mode.”

Regarding this claim feature, Petitioner points to Figures 5.3.3.2-2 and 5.3.3.3-2 of TS 23.401, each of which illustrates “the signaling of various network elements when a UE is operating in an idle mode and performs a Routing Area Update (RAU).” Pet. 30 (citing Ex. 1003 ¶ 121; Ex. 1005 §§ 5.3.3.2.2, 5.3.3.3.2). At Steps 2a and 2b in Figures 5.3.3.2-2 and 5.3.3.3-2 of TS 23.401, a UE sends RAU Request to the SGSN of the 2G/3G network, and at Step 3, a Context Request is sent from the 2G or 3G-SGSN to an MME of an LTE network. *Id.* at 30–33 (citing Ex. 1003 ¶¶ 122, 123, 126; Ex. 1005 §§ 5.3.3.2.2, 5.3.3.3.2).

As further support, Petitioner points to Step 2 of Figure 13 of TS 33.821, which shows an MME receiving a context request for requesting a mobility management context. *Id.* at 33–34 (citing Ex. 1003 ¶¶ 127–128; Ex. 1006 § 7.4.11.3). This context request is “according to” the “TAU request” because it is indicated in the figure as being within the “MME context request” message in Step 2 of Figure 13. *Id.*; *see also* Ex. 1003 ¶ 128 (“[E]ven though Fig. 13 of TR 33.821 contemplates a move from an LTE network to another LTE network, the security steps performed by the ‘old MME’ (i.e., the claimed MME), would be usable in the inter-RAT procedure of TS 23.401 and the claims. Indeed, both references refer to the context request as a ‘context request.’ Accordingly, the person of skill in the art would look to the disclosure of the ‘context request’ of TR 33.821 when attempting to perform an idle mode RAU to a 2G or 3G network.”).

Patent Owner, at this stage of the proceeding, has not presented specific arguments regarding this claim limitation. On the record now

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before us, we are persuaded that Petitioner has shown a reasonable likelihood of demonstrating that the asserted combination teaches or suggests this limitation of claim 1.

Claim Element 1B – Sending the Mobility Management Context to the SGSN

Claim 1 recites “sending the mobility management context to the SGSN, wherein the mobility management context comprises information for determining security capacities supported by the UE and authentication vector (AV)-related keys that are deduced according to a root key of the MME.” Regarding this claim feature, Petitioner points to Step 4 in Figures 5.3.3.2-2 and 5.3.3.3-2 of TS 23.401, each of which discloses transmitting a context response from an MME to an SGSN. Pet. 34–35 (citing Ex. 1005 §§ 5.3.3.2.2, 5.3.3.3.2). According to Petitioner, a person of ordinary skill in the art “would have readily understood that a ‘mobility management context’ was known to contain information relating to a UE that is used by network elements to allow the UE to connect with the network.” *Id.* at 35 (citing Ex. 1003 ¶ 130). Petitioner further points to discussion in TS 23.401 that an “MME context” includes, among other things “Authentication Quintets,” which refer to the “well-known 3G authentication vector which contains values used in authentication and key agreement (AKA).” *Id.* at 35–36 (citing Ex. 1003 ¶ 131; Ex. 1005 § 5.3.3.1).

Petitioner further points to TR 33.821 as providing additional detail about security procedures when operating in a 4G/LTE network, including specifically that “the context response contains ‘authentication vector (AV)-related keys that are deduced according to a root key of the MME.’” *Id.* at 36; Ex. 1003 ¶ 134. Thus, according to Petitioner, “to secure the network structure of TS 23.401, the person of skill in the art would have sent

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the authentication vector (AV)-related keys that are deduced according to a root key of the MME as part of the context response.” Pet. 37; *see* Ex. 1003 ¶¶ 129–137.

Patent Owner asserts that “Petitioner is incorrect in asserting that a [person of ordinary skill in the art] would have understood the MME Context of the step 4 context responses to be the same as the MME Context in TS 23.401’s §5.3.3.1, and is further incorrect in asserting that the step 4 context responses include any 3G authentication vector that contains values used in AKA.” Prelim. Resp. 33. Patent Owner further asserts that “Authentication” and “Security Functions” are performed in Step 5, “without involvement of the MME, and not via the step 4 context response.” *Id.* at 34. Patent Owner also argues that certain of Petitioner’s evidence is directed to the transfer of authentication vectors during an inter-RAT handover rather than in the context of idle state mobility, or to an LTE-to-LTE transfer rather than an LTE-to-2G/3G context. *Id.* at 42–45.

Patent Owner, however, has not, at this stage of the proceeding, produced persuasive evidence to rebut Dr. Lyon’s testimony that this claim element would have been obvious to a person of ordinary skill in the art (*see, e.g.*, Ex. 1003 ¶¶ 129–137), which we credit based on the record now before us. *See also Estee Lauder*, 129 F.3d at 595 (“[A]rguments of counsel cannot take the place of evidence lacking in the record.”). Accordingly, we are persuaded that Petitioner has shown a reasonable likelihood of demonstrating that the asserted combination teaches or suggests this limitation of the claims.

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Claim Element 1C – defining the AV-Related Keys

Claim 1 recites “wherein the AV-related keys comprise an Integrity Protection Key (IK) and a Ciphering Key (CK), or comprise values derived from the IK and the CK through an unidirectional transformation.”

Regarding this claim feature, Petitioner points to TR 33.821, which specifically “discloses that the ‘MME [shall] convert Kasme with an one-way function to Ck,Ik.’” Pet. 37 (quoting Ex. 1006 § 7.4.3.2 (alteration in Petition)); Ex. 1003 ¶ 139. Petitioner also points to Figure 12 of TR 33.821 as disclosing the second claimed alternative, namely deriving keys from CK and IK through a unidirectional transformation. Pet. 38–39 (citing Ex. 1003 ¶¶ 140–143; Ex. 1006 §§ 7.4.3.2, 7.4.7.2).

Patent Owner asserts that “Petitioner is incorrect in asserting that [an MME deriving Ck and Ik from Kasme] renders obvious that the AV-related keys deduced according to a root key of the MME in the claimed inter-RAT idle mode mobility, includes Ck and Ik.” Prelim. Resp. 45. Patent Owner also argues that Petitioner’s evidence is directed to the concept of handover, rather than idle mode routing area updates. *Id.* at 46.

Patent Owner, however, has not, at this stage of the proceeding, produced persuasive evidence to rebut Dr. Lyon’s testimony that this claim element would have been obvious to a person of ordinary skill in the art (*see, e.g.*, Ex. 1003 ¶¶ 138–143), which we credit based on the record now before us. *See also Estee Lauder*, 129 F.3d at 595 (“[A]rguments of counsel cannot take the place of evidence lacking in the record.”). Accordingly, we are persuaded that Petitioner has shown a reasonable likelihood of demonstrating that the asserted combination teaches or suggests this limitation of the claims.

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Conclusion Regarding Claim 1

We are persuaded, on the record now before us, that Petitioner has shown sufficiently that the combination of TS 23.401 and TR 33.821 teaches or suggests all of the limitations of claim 1, and has articulated sufficient reasoning why it would have been obvious to combine these references in the proposed manner. We, thus, are persuaded that Petitioner has demonstrated a reasonable likelihood of succeeding in showing that the combination of TS 23.401 and TR 33.821 renders obvious claim 1.

c. Claims 2 and 3

Regarding independent claims 2 and 3, Petitioner generally refers back to its arguments for similar limitations recited in independent claim 1. *See* Pet. 39–43; Ex. 1003 ¶¶ 144–189. Patent Owner also presents its arguments together for each of these claims. *See* Prelim. Resp. 32–47. For similar reasons as discussed above with respect to claim 1, we are persuaded, on the record now before us, that Petitioner has shown sufficiently for purposes of this Decision that the combination of TS 23.401 and TR 33.821 teaches or suggests all of the limitations of claims 2 and 3, and has articulated sufficient reasoning why it would have been obvious to combine these references in the proposed manner. We, thus, are persuaded that Petitioner has demonstrated a reasonable likelihood of succeeding in showing that the combination of TS 23.401 and TR 33.821 renders obvious claims 2 and 3.

F. Asserted Obviousness in View of TS 23.060 and TR 33.821

Petitioner asserts that claims 1–3 are unpatentable under 35 U.S.C. § 103(a) as obvious in view of TS 23.060 and TR 33.821. Pet. 44–59. In

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addition to the arguments that TR 33.821 does not qualify as prior art, and that Petitioner does not appropriately address the *Graham* factors (both discussed above), Patent Owner argues that the cited combination does not disclose all elements of the challenged claims (Prelim. Resp. 47–58), and that Petitioner has not provided sufficient reasons to combine the references (*id.* at 66–69).

We have reviewed the parties' contentions and supporting evidence. Given the evidence on this record, and for the reasons explained below, we determine that the information presented shows a reasonable likelihood that Petitioner would prevail on this asserted ground.

1. Summary of TS 23.060 (Ex. 1007)

TS 23.060 is a Technical Specification produced by a working group of 3GPP. Ex. 1007, Forward. TS 23.060 addresses the operation of the 2G/3G GPRS network during mobility events. Pet. 44; Ex. 1003 ¶ 191.

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Figure 33 of TS 23.060 is reproduced below.

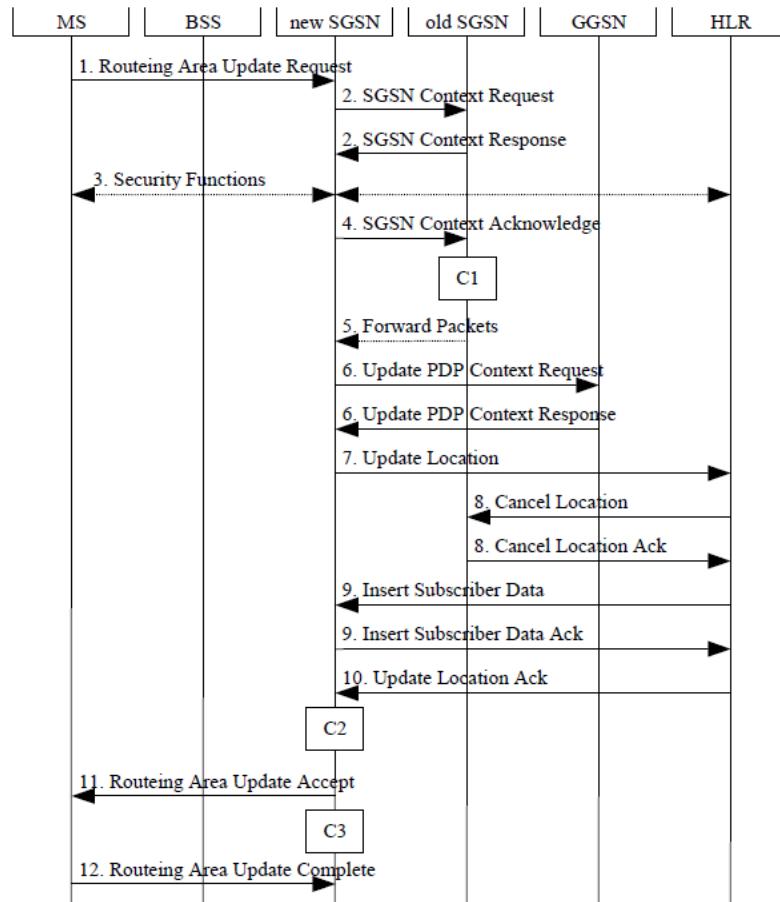


Figure 33: Inter SGSN Routeing Area Update Procedure

Figure 33, reproduced above, shows a procedure for a Routeing Area Update when a UE is moving from an old SGSN to a new SGSN. Ex. 1007
§ 6.9.1.2.2. In step 1, a target network element (SGSN) receives a Routing

Area Update (RAU) request from a UE that contains security capabilities.

Id. (“The MS sends a Routeing Area Update Request (P-TMSI . . . MS Network Capability) to the new SGSN.”). In step 2, the old SGSN sends a Context Response, including among other things authentication vector-related keys. *Id.*; *see also id.* § 13.2 (Table 6).

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2. Analysis

As discussed above, TS 23.060 teaches security procedures for mobility between 2G/3G networks. Petitioner relies on TR 33.821 for features specific to transferring to the LTE network. According to Petitioner, “[o]ne wanting to update the RAU procedures of [TS]23.060 in order to implement the new 4G/LTE network (and its corresponding security requirements) would . . . naturally look to TR 33.821 and would expect predictable results,” because TR 33.821 “addresses security aspects of the new LTE/SAE network, including how security is handled during mobility events to/from the new LTE network and legacy 2G/3G networks.” Pet. 44 (citing Ex. 1003 ¶ 191); *see also* Ex. 1003 ¶ 192 (indicating that this is in fact what 3GPP designers did).

Petitioner provides similar arguments and evidence regarding the combination of TS 23.060 and TR 33.821 as applied to the independent claims as discussed above with respect to the combination of TS 23.401 and TR 33.821, and relies on the testimony of Dr. Lyon. *See* Pet. 44–59 (citing Ex. 1003 ¶¶ 191–192, 196, 199, 201–205, 207–210, 212–213, 216–220, 222–269; Ex. 1007 §§ 6.9.1.2.2, 6.9.1.3.2, 6.9.2.1, 13.2; Ex. 1006 §§ 7.2.2.2, 7.4.3.2, 7.4.4, 7.4.10, 7.4.11, 7.4.11.3, 7.4.13.2). Likewise, Patent Owner similarly disagrees with certain portions of Petitioner’s arguments and Dr. Lyon’s testimony (Prelim. Resp. 47–58, 66–69), but at this stage of the proceeding has not produced persuasive evidence rebutting Dr. Lyon’s testimony that the challenged claims would have been obvious to a person of ordinary skill in the art, which we credit based on the record now before us. *See also Estee Lauder*, 129 F.3d at 595 (“[A]rguments of counsel cannot take the place of evidence lacking in the record.”).

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Accordingly, we are persuaded that Petitioner has shown a reasonable likelihood of demonstrating that the asserted combination renders obvious the challenged claims.

G. Asserted Obviousness in View of Song and TR 33.821

Petitioner asserts that claims 1–3 are unpatentable under 35 U.S.C. § 103(a) as obvious in view of Song and TR 33.821. Pet. 59–72. In addition to the arguments that TR 33.821 does not qualify as prior art, and that Petitioner does not appropriately address the *Graham* factors (both discussed above), Patent Owner argues that the cited combination does not disclose all elements of the challenged claims (Prelim. Resp. 59–65), and that Petitioner has not provided sufficient reasons to combine the references (*id.* at 69–70).

We have reviewed the parties’ contentions and supporting evidence. Given the evidence on this record, and for the reasons explained below, we determine that the information presented shows a reasonable likelihood that Petitioner would prevail on this asserted ground.

1. Summary of Song (Ex. 1008)

Song relates to a method and system for “optimizing [an] authentication procedure” “during handover [from] an existing system to a new system.” Ex. 1008, at [54], [57]. Figure 9 of Song is reproduced below.

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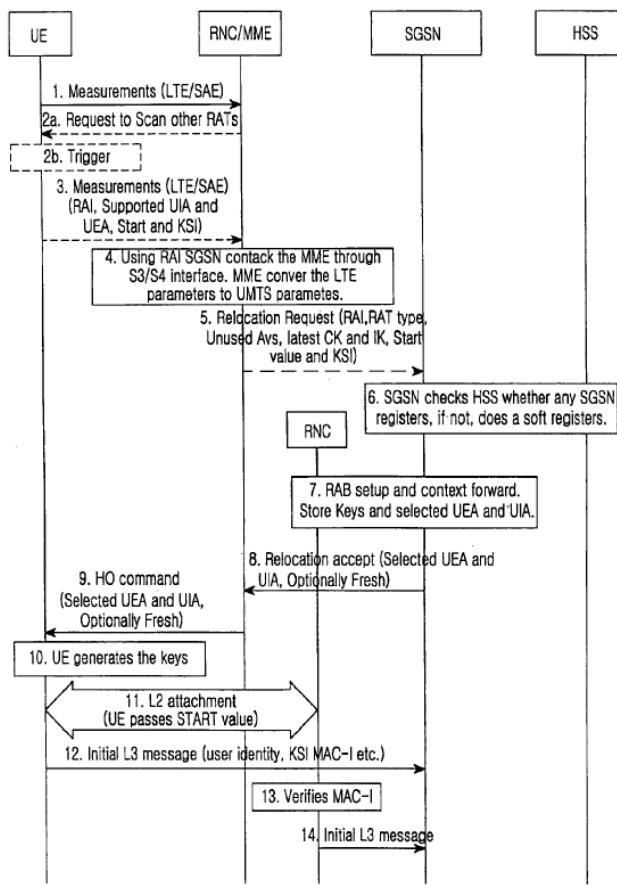


FIG.9

Figure 9, reproduced above, illustrates the message flow procedure for a handover from an LTE system to a 3G system. *Id.* at 5:1–3. According to Song, the UE sends the selected UMTS Integrity Algorithm (UIA) and UMTS Encryption Algorithm (UEA) to the MME, at step 3, and the MME sends a HO request message, containing security context and keys among other things, to the SGSN, at step 5. *Id.* at 13:17–19, 13:24–27. At step 7, the SGSN distributes the security context, including keys. *Id.* at 13:39–43. At steps 8 and 9, the SGSN sends the HO accept message (which includes the selected UEA and UIA) to the MME, and the MME forwards it to the UE. *Id.* at 13:44–49.

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2. Analysis

Song teaches authentication procedures for mobility between 2G, 3G, 4G, and non-3GPP networks. Petitioner relies on TR 33.821 for security features specific to the LTE network. According to Petitioner, “[o]ne skilled in the art wanting to update the existing 2G/3G RAU procedures to include a 4G to 2G/3G RAU process would . . . naturally look to [TR 33.821 and Song] and would have a reasonable expectation of success,” because TR 33.821 “addresses security aspects of the new LTE/SAE network, including how security is handled during mobility events to/from the new LTE network and legacy 2G/3G networks.” Pet. 59; *see* Ex. 1003 ¶¶ 271–274.

Petitioner provides similar arguments and evidence regarding the combination of Song and TR 33.821 as applied to the independent claims as discussed above with respect to the combination of TS 23.401 and TR 33.821, and relies on the testimony of Dr. Lyon. *See* Pet. 59–72 (citing Ex. 1003 ¶¶ 275, 277–284, 286–288, 291–330; Ex. 1008, at 1:25–2:6, 3:65–4:10, 5:1–3, 13:6–67, Fig. 9; Ex. 1006 §§ 7.2.2.2, 7.4.3.2, 7.4.4, 7.4.7, 7.4.7.2, 7.4.10, 7.4.11, 7.4.11.3, 7.4.13.2, Fig. 13).

Likewise, Patent Owner similarly disagrees with certain portions of Petitioner’s arguments and Dr. Lyon’s testimony (Prelim. Resp. 59–65, 69–70), but at this stage of the proceeding has not produced persuasive evidence rebutting Dr. Lyon’s testimony that the challenged claims would have been obvious to a person of ordinary skill in the art, which we credit based on the record now before us. *See also Estee Lauder*, 129 F.3d at 595 (“[A]rguments of counsel cannot take the place of evidence lacking in the record.”).

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Accordingly, we are persuaded that Petitioner has shown a reasonable likelihood of demonstrating that the asserted combination renders obvious the challenged claims.

H. Redundancy and 35 U.S.C. § 325(d)

Patent Owner argues that Petitioner “fail[s] to demonstrate the non-redundancy of its proposed grounds.” Prelim. Resp. 72. Patent Owner asserts that we should “deny at least two of Petitioner’s proposed grounds as redundant.” *See id.* at 72–73. Patent Owner also argues that Petitioner “fails to justify its reliance . . . upon [TS 23.401 and TR 33.821] that were applied by the examiner during the ’268 Patent’s original prosecution,” and “submits that the Board should exercise its discretion under 35 U.S.C. §325(d) to deny institution of at least” the ground based on these references. *See id.* at 70–71. In this case, we exercise our discretion and substantively consider in our Decision each of the asserted grounds advanced by Petitioner. 37 C.F.R. § 42.108(a).

III. CONCLUSION

As discussed above, we institute an *inter partes* review of claims 1–3 of the ’268 patent. At this preliminary stage in the proceeding, we have not made a final determination with respect to the patentability of any challenged claim or the construction of any claim term.

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IV. ORDER

Accordingly, it is

ORDERED that pursuant to 35 U.S.C. § 314(a), an *inter partes* review is hereby instituted as to claims 1–3 of U.S. Patent No. 9,060,268 B2 on the following grounds:

Whether claims 1–3 would have been obvious under 35 U.S.C. § 103(a) in view of TS 23.401 and TR 33.821;

Whether claims 1–3 would have been obvious under 35 U.S.C. § 103(a) in view of TS 23.060 and TR 33.821;

Whether claims 1–3 would have been obvious under 35 U.S.C. § 103(a) in view of Song and TR 33.821;

FURTHER ORDERED that no other ground of unpatentability is authorized for this *inter partes* review;

FURTHER ORDERED that the parties shall address, in the Patent Owner Response and Reply thereto, whether the “receiver,” “processor,” and “transmitter” limitations of claim 2 are means-plus-function limitations pursuant to 35 U.S.C. § 112, ¶ 6; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; the trial will commence on the entry date of this decision.

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